

Last DSM Algorithm EMC and FPD Version

27th January 2004

Input Bits

Input Channel	Bit Description
0	CTB Multiplicity Bits 0:15 – Multiplicity
1	VTX Information Bit 0 – BBC TAC difference in window Bit 1 – ZDC TAC difference in window Bit 2 – BBC East small-tile ADC sum over threshold Bit 3 – BBC West small-tile ADC sum over threshold Bits 4:5 – Unused Bit 6 – ZDC East ADC sum over threshold Bit 7 – ZDC West ADC sum over threshold Bit 8 – ZDC East TAC in window Bit 9 – ZDC West TAC in window Bit 10 – ZDC East+West attenuated sum over threshold Bits 11:15 - Unused
2	Unused
3	EMC Information Bits 0:1 - Unused Bits 2:3 – BEMC high-tower bits Bits 4:8 - Unused Bits 9:10 – EEMC high-tower bits Bits 11:15 - Unused
4	Miscellaneous Information Bit 0 – Blue bunch filled Bit 1 – Yellow bunch filled Bits 2:15 - Unused
5	FPD Information Bit 0 – FPD trigger conditions met Bits 1:15 - Unused
6	Special Trigger Requests Bits 0:2 – selected special trigger request (zero if no request) Bits 3:6 – detector number (0:15) of detector making request Bits 7:13 – Unused Bit 14 – Zero-bias bit Bit 15 – Random bit
7	Unused

Registers

Register	Register Description
0	16-bit low threshold for the CTB Multiplicity
1	16-bit medium threshold for the CTB Multiplicity
2	16-bit high threshold for the CTB Multiplicity

Output Bits

Bit	Description
Bits 0:14	<p>If Bit 15 = 1 – Special Trigger Requests</p> <p>Bits 0:2 – Special Trigger request</p> <p>Bits 3:6 – Special Trigger detector</p> <p>Bit 7 – Random bit</p> <p>Bits 8:15 – Unused, set to 1</p> <p>Else – Physics Data</p> <p>Bits 0:1 – two bits encoding a number between 0 and 3 indicating which of three multiplicity threshold was passed</p> <p>Bit 2 – BBC TAC difference in window</p> <p>Bit 3 – ZDC TAC difference in window</p> <p>Bit 4 – Both BBC small-tile ADC sums over threshold</p> <p>Bit 5 – Both ZDC ADC sums over threshold</p> <p>Bit 6 – Both ZDC TACs in window</p> <p>Bit 7 – ZDC East+West attenuated sum over threshold</p> <p>Bit 8 - Zero-bias bit</p> <p>Bit 9 - Blue bunch filled AND yellow bunch filled</p> <p>Bits 10:11 – BEMC high-tower bits</p> <p>Bits 12:13 – EEMC high-tower bits</p> <p>Bit 14 – FPD bit</p>
Bit 15	Flag indicating meaning of bits 0:14
Bits 16:31	Same definitions as bits 0:15

Internal Logic

- The CTB multiplicity is compared to three thresholds whose values are set during RUN configuration (Regs. 0, 1 and 2)
- A decision is made to pass Physics Data or a Special Trigger Request to the TCU.
 1. The 3 bits of the special trigger request and the random bit are OR'ed together
 2. If ANY of these bits is "1" then output bit 15 will be 1, and the special trigger request and the random bit will be passed to the TCU.
 3. If NONE of these bits is "1" then output bit 15 will be 0 and any physics data will be passed to the TCU.